

CLAIMS

1. A method for resetting bus segments to clear bus hang in an I/O subsystem having a plurality of bus segments, each bus segment having a set of devices and a bus that is coupled to the set of devices, the I/O subsystem having at least one expander, each expander being arranged to couple a pair of buses for propagating communication signals, the method comprising:

a) asserting a reset signal on a first bus segment;

b) resetting each expander coupled to the first bus segment and resetting each device in the first bus segment in response to the reset signal, wherein each expander coupled to the first bus segment isolates the reset signal such that the reset signal is not propagated to the other bus segments; and

c) for each expander coupled to the first bus segment,

c1) isolating all communication signals such that the each expander prevents propagation of the communication signals between the first bus and other bus;

c2) determining whether the other bus is no longer hung;

c3) if the other bus is still hung, issuing a far-side reset signal on the other bus to reset the other bus; and

c3) if the other bus is not hung, allowing propagation of communication signals between the first bus and the other bus.

2. The method as recited in claim 1, wherein if the other bus is still hung, operations b) and c) are repeated for other expanders coupled to each of the other buses.

3. The method as recited in claim 1, wherein each expander enters into a
5 reset isolation mode in response to the reset signal.

4. The method as recited in claim 1, wherein the each expander enters into a segment isolation mode to isolate all communication signals between the first bus and other bus.

5. The method as recited in claim 1, wherein the I/O subsystem is an SCSI I/O subsystem and wherein the other bus is no longer hung when the other bus is in a BUS FREE state.

6. The method as recited in claim 1, wherein a host computer in the I/O
15 subsystem on the first bus segment asserts the reset signal on the first bus segment.

7. The method as recited in claim 4, wherein the each expander exits the segment isolation mode when the other bus is not hung to allow the propagation of
20 communication signals between the first bus and the other bus.

8. The method as recited in claim 7, wherein the bus segments are reset one segment at a time from the first bus segment.

9. An expander device for isolating a reset between a pair of bus segments in an I/O subsystem, each bus segment having a set of devices and a bus that is coupled to the set of devices, the expander device being arranged to couple the buses in the bus segments for communication in the I/O subsystem, the expander device including:

a first I/O interface circuit configured to be coupled to a first bus segment, the first I/O interface circuit being adapted to interface input and output communication signals with the first bus segment;

a second I/O interface circuit configured to be coupled to a second bus segment and being adapted to interface the input and output communication signals with the second bus segment; and

an expander controller arranged to communicate the input and output communication signals between the first and second I/O interface circuits, the expander controller being configured to control communication between the first and second bus segments, the expander controller including a reset and segment isolation controller adapted to isolate a reset signal received on the first bus segment from propagating to the second bus segment, wherein the expander controller isolates all signals to prevent propagation of the signals between the first and second bus segments after isolating the reset signal until the bus in the second bus segment is cleared from a hang condition.

10. The expander device as recited in claim 1, wherein the expander controller is adapted to reset the expander device in response to the reset signal and wherein all devices in the first bus segment reset in response to the reset signal such that the bus in the first bus segment is cleared from the hang condition.

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11. The expander device as recited in claim 9, wherein if the second bus is still hung, the expander controller issues a far-side reset signal to the bus in the second bus segment to reset the second bus segment.

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12. The expander device as recited in claim 9, wherein the expander controller allows propagation of all signals between the first and second bus segments when the bus in the second bus segment is cleared from the hang condition.

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13. The expander device as recited in claim 9, wherein the expander controller enters into a reset isolation mode in response to the reset signal.

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14. The expander device as recited in claim 9, wherein the expander controller enters into a segment isolation mode to isolate all signals between the first and second bus segments.

15. The expander device as recited in claim 9, wherein the I/O subsystem is an SCSI I/O subsystem and wherein the bus in the second segment is cleared from the hang condition when the other bus is in a BUS FREE state.

16. The expander device as recited in claim 9, wherein a host computer on the first bus segment in the I/O subsystem asserts the reset signal on the first bus segment.

5 17. The expander device as recited in claim 9, wherein the expander controller exits the segment isolation mode when the bus in the second bus segment is not hung to allow the propagation of communication signals between the buses in the first and second bus segments.

10 18. The expander device as recited in claim 9, wherein the bus segments are reset one segment at a time from the first bus segment.

15 19. The expander device as recited in claim 9, wherein the reset and segment isolation controller generates a reset isolation signal, which is provided to reset output buffers in the first and second I/O interface circuits to disable propagation of the reset signal to the first and second bus segments.

20 20. The expander device as recited in claim 9, wherein the reset and segment isolation controller generates a segment isolation signal, which is provided to all output buffers in the first and second I/O interface circuits to disable output of the communication signals from the first and second I/O interface circuits to the first and second bus segments.

21. An SCSI expander for resetting bus segments to clear bus hang in an SCSI I/O subsystem, each bus segment having a set of devices and a bus that is coupled to the set of devices, the SCSI expander being arranged to couple a first bus in a first bus segment and a second bus in a second bus segment, the SCSI expander being configured to repeat communication signals by receiving the communication signals from one SCSI bus segment and outputting the communication signals to the other SCSI bus segment, the SCSI expander comprising:

a first SCSI I/O interface circuit adapted to interface communication signals with the first SCSI bus segment;

a second SCSI I/O interface circuit adapted to interface the communication signals with the second SCSI bus segment; and

an SCSI expander controller coupled to communicate the communication signals between the first and second SCSI I/O interface circuits, the SCSI expander controller being arranged to control communication between the first and second SCSI bus segments, the SCSI expander controller including a reset and isolation segment controller adapted to isolate a reset signal received on the first bus segment from propagating to the second bus segment, wherein the SCSI expander controller isolates all communication signals to prevent propagation of the communication signals between the first and second bus segments after isolating the reset signal until the second bus is in a BUS FREE state.

22. The SCSI expander as recited in claim 21, wherein the SCSI expander controller is adapted to reset the SCSI expander in response to the reset signal and wherein all devices in the first bus segment reset in response to the reset signal such that the first bus is in the BUS FREE state.

23. The SCSI expander as recited in claim 21, wherein if the second bus is still hung, the SCSI expander controller issues a far-side reset signal to the second bus to reset the second bus segment.

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24. The SCSI expander as recited in claim 21, wherein the SCSI expander controller allows propagation of the communication signals between the first and second bus segments when the second bus is in the BUS FREE state.

25. The SCSI expander as recited in claim 21, wherein the SCSI expander controller enters into a reset isolation mode in response to the reset signal.

26. The SCSI expander as recited in claim 21, wherein the SCSI expander controller enters into a segment isolation mode to isolate the communication signals between the first and second bus segments.

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~~28~~ 28. The SCSI expander as recited in claim 21, wherein a host computer on the first bus segment in the SCSI I/O subsystem asserts the reset signal on the first bus segment.

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~~28~~ 28. The SCSI expander as recited in claim 21, wherein the SCSI expander controller exits the segment isolation mode when the second bus is in the BUS FREE

state allow the propagation of the communication signals between the first and second bus segments.

Renumbering

Rule 1.126

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The SCSI expander as recited in claim 21, wherein the bus segments are

5 reset one segment at a time from the first bus segment.

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